

### ECHO 586 / Robin Pfister



## Goals, Objectives, Benefits

- Interoperability middleware solution enabling a marketplace of resource offerings
  - Open, XML-based APIs
  - Supports net-centric architectures and solutions
  - Set of Interoperable registries for inventory-level (metadata & browse images) and services
  - Provides user accounts and common infrastructure for the registries
  - Built upon a layered architecture with extensible infrastructure for supporting community unique protocols
  - Available as Open Source for re-use in other domains or applications
- To enable sharing and brokering of inventory-level resources (data, services, tools) among a federated community. Leverage work/resources of others
  - Anyone can contribute
- Anyone can build a tailored view of the holdings to serve their specific community

  2005 ISD Technology Workshop

## **Approach**

Includes approach, first level technical details, design, how it was tested, etc. If relevant, the process and method of doing technology can be shared.

- 1998 Study team initiated to look at community needs, market analysis, architecture analysis
- Initiated processes to involve stakeholders at various levels to ensure community needs are met
- Iterative development cycle
- Layered Architecture supports standards and protocol adaptors as appropriate and can be built/contributed by anyone. E.g.
  - ECS (complete)
  - OGC (in progress)

FGDC/NSDI

GCMD

## Approach: Stakeholder Engagement

Draft

Require

-ments

& Ideas

Community

Research,
Application &
Education
User
Community

Potential ECHO Users & Other Stakeholders

> The ECHO System

ECHO Technical Committee

ECHO Users

Client Providers Data Providers Service Providers

ECHO Operations Team

ECHO Development Team

ECHO IV&V

Weekly Technical Telecons, listservs ECHO Project Advisory Group

•NASA Headquarters

•Earth Science Technology Office Rep

•GSFC AETD SDS

Branch Rep
•ESDIS

Representatives:
- Development

Manager
- Operations

- Operations Manager

 ESDIS External Development and

Interface Office

IMS

Dev & Ops

Priorities, Leads
Requirements

Weekly

Needs

IMS Dev & Ops Teams

2005 ISD Technology Workshop

Conferences

Publications

Workshops

Discussions

Training.

Info

# Approach: Layered Architecture

ClientClient Config Adapter Info ORNL Proxy Request Submit **Business Objects** Partner Interface (Quote, Submit, Cancel) PartneCatalo Place User Admin Client Interface (RMI (ECHO API Services Mgmt SearchOrderAccts API Client Adapter Service Registry 060 Request Cancel **ECHO V0 GW Proxy** (SOAP) Science **ClientClient** Request Metadata Quote Catalog **Full Record** Partial Record Insert, Update, Deletensert, Update, Delete Ingest (XML via FTP)



#### **Data Registry**

### Representing data resources through metadata

- Publish Capability
  - Supports Collection, Granules and Browse publication
  - Product Specific Attributes extend the standard data model
- Discovery Capability
  - Collection/Dataset
  - Granule/Inventory
  - Based on Z39.50 Standard
  - Full Results Management
- Access Capability
  - Online Access
  - Legacy Order Mechanisms
  - Access Controls
    - Visibility of data resources
    - Access to data resources
  - Metadata Subscriptions

#### **Service Registry**

### Service offerings leveraging Web Service Standards

- Publish Capability
  - Advertisements
  - Service Interfaces
  - Service Implementations
  - Service GUIs
  - Linkage to Data Registry
- Discovery Capability
  - UDDI Standard Based
  - Data Registry View
    - What services are appropriate for this collection/granules?
- Future
  - Service Brokering
  - Access Controls



### Results, Status, Next Steps

- Data Partners:
  - 5 Operational Data Providers
  - 3 Development/Test
  - Over 40 Million data granules and over 6 Million Browse Images available
- Client Partners:
  - 2 Operational
  - 9 Development/Test



- Finding additional partners for Earth science domain implementation
  - Earth Science Information Partner (ESIP) Federation
  - Interagency Participation
  - International Participation
- Finding potential Re-Users
  - Space Science (LWS, Virtual Observatories)
  - Other non-science applications



### Results, Status, Next Steps

- Load-balanced redundant back-up facility
- Service Brokering
- Asynchronous Searching
- Reference client
- Event Subscriptions
- Orchestration/Service Chaining
- Interagency and International Interoperability